

Knowledge organiser: pewter pendant (Theory Focus)

What is product analysis and why do it?

- **Product analysis** is the term used when a designer look at other products to see how they were made, how they could be improved and as a source of inspiration for their own designs.
- You can use **ACCESS FM** as a way of remembering what types of things you should look at.

ACCESS FM:	Questions:
Aesthetics	What colours are used? Are the graphics dull or shiny?
Cost	How much would it cost to buy?
Customer	Who is going to buy this product? Who is going to use it?
Environment	Does it use recycled materials? Could it be recycled?
Size	How tall/wide/long is it, in mm?
Safety	Are there any sharp edges or small parts?
Function	What does it do? How does it do that? What mechanisms are used?
Materials	What is it made from?
Manufacturing	What processes were used to make it?

Types of metals

There are two main types of metal:

- **Ferrous metals** contain iron as their largest alloying element, which means that they are magnetic and will rust if exposed to the elements. They are normally cheaper metals such as steel and cast iron.
- **Non-ferrous** metals do not contain iron, which means they are not magnetic and will not rust. They are normally metals that cost more such as brass, bronze and gold.
- Almost all metals can be recycled.

Alloys

Most metals are not used as pure chemical elements; they are mixed with other elements to improve their properties.

- A mixture of two or more metals is called an **alloy**.
- Aluminium is an example of an alloy.

Where do metals come from?

Metals are made from metal ores, which are dug from quarries or mines.

Metal is extracted from the ore using heat in a process called **smelting** – this needs a lot of energy.



Fossil fuels

- **Fossil fuels** include **oil, gas** and **coal**.
- These are non-renewable – it means they will eventually run out.
- These are burnt and the heat is converted to other types of energy.
- Burning fossil fuels creates carbon emissions, which can cause global warming.

Energy and electricity

The most common type of energy used is electricity.

Most energy sources are converted into electricity by turning a generator – this may be by burning the energy source or the movement of the source.

Renewable forms of energy

- **Renewable energy** sources are naturally replenished by nature – they will never run out and do not create carbon emissions in use.
- **Wind power** uses wind to turn turbines.
- **Hydropower** uses the movement of tides or water flowing through a dam to turn a generator.
- **Solar power** makes electricity directly from sunlight without needing a turbine.

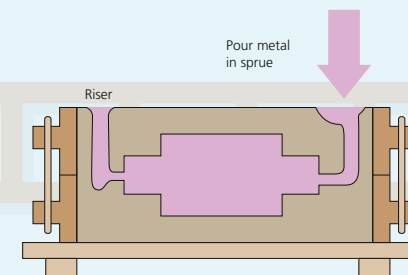
Nuclear power

Nuclear power is also a non-renewable energy source.

- It uses heat generated by radioactive uranium.
- However, unlike fossil fuels, there is enough uranium to last for a very long time.

Casting

- Casting is a shaping process.
- It can produce complicated 3D shapes that could not be made just by using a machining process.
- It involves pouring melted metal into a mould and allowing it to cool and harden.
- Moulds can be made from compressed sand or other metals.



The sand casting process